

Survival outcomes after adrenal gland metastasectomy - a Danish nation-wide study

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WHY?

- ▶ **Adrenal gland common site of metastasis**

- ▶ Increasing use of imaging (follow-up)
- ▶ Curative metastasectomy
- ▶ Increasing demand

- ▶ **Current evidence**

- ▶ Limited data on survival
- ▶ Sanctuary site

- ▶ **Aim**

- ▶ National study
- ▶ Prognostic factors for long-term survival



METHODS

Retrospective cohort study

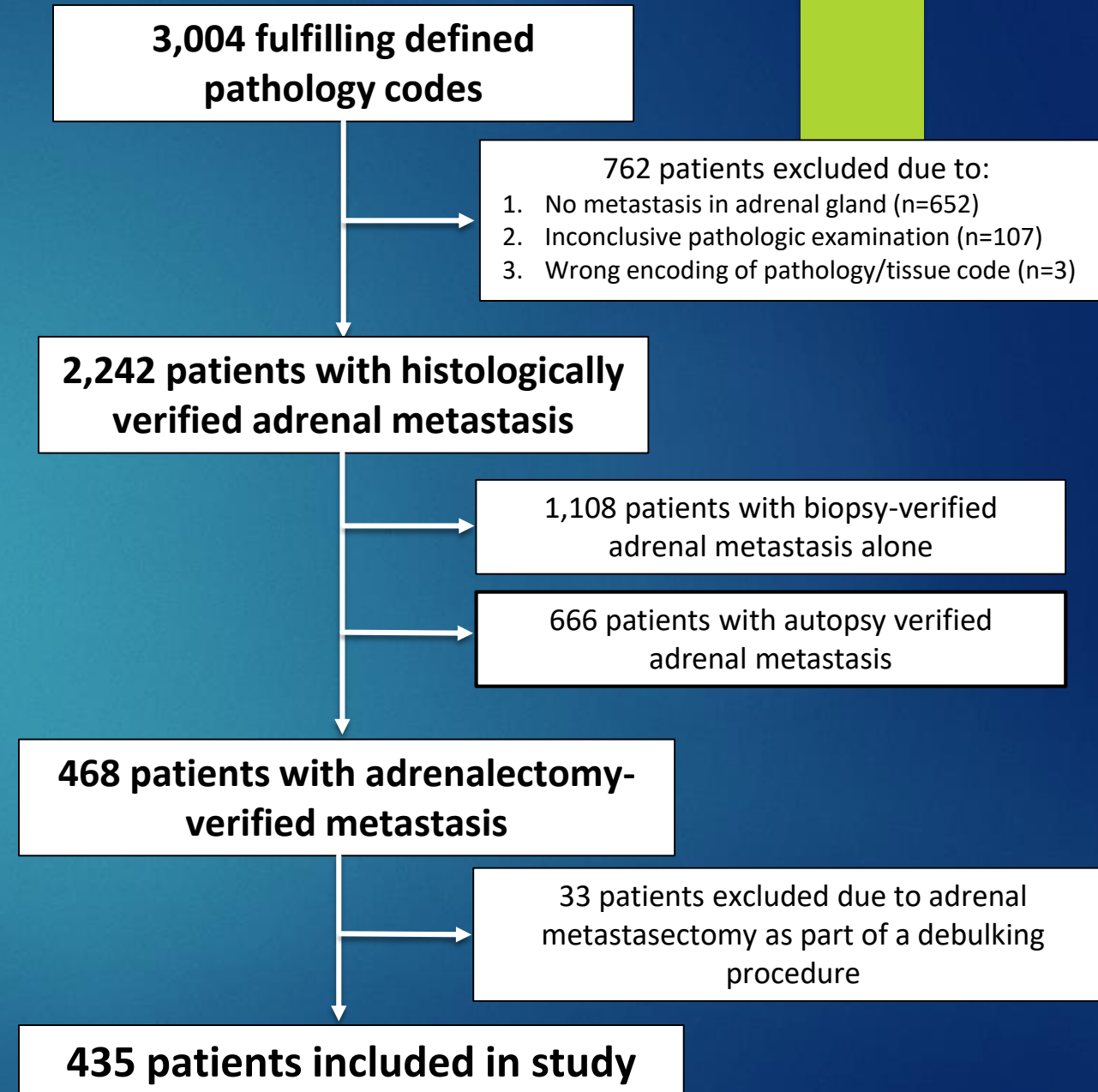
Danish Pathology Registry

Inclusion:


- Adrenalectomy 2000-2018
- Tissue codes: Adrenal gland+metastasis



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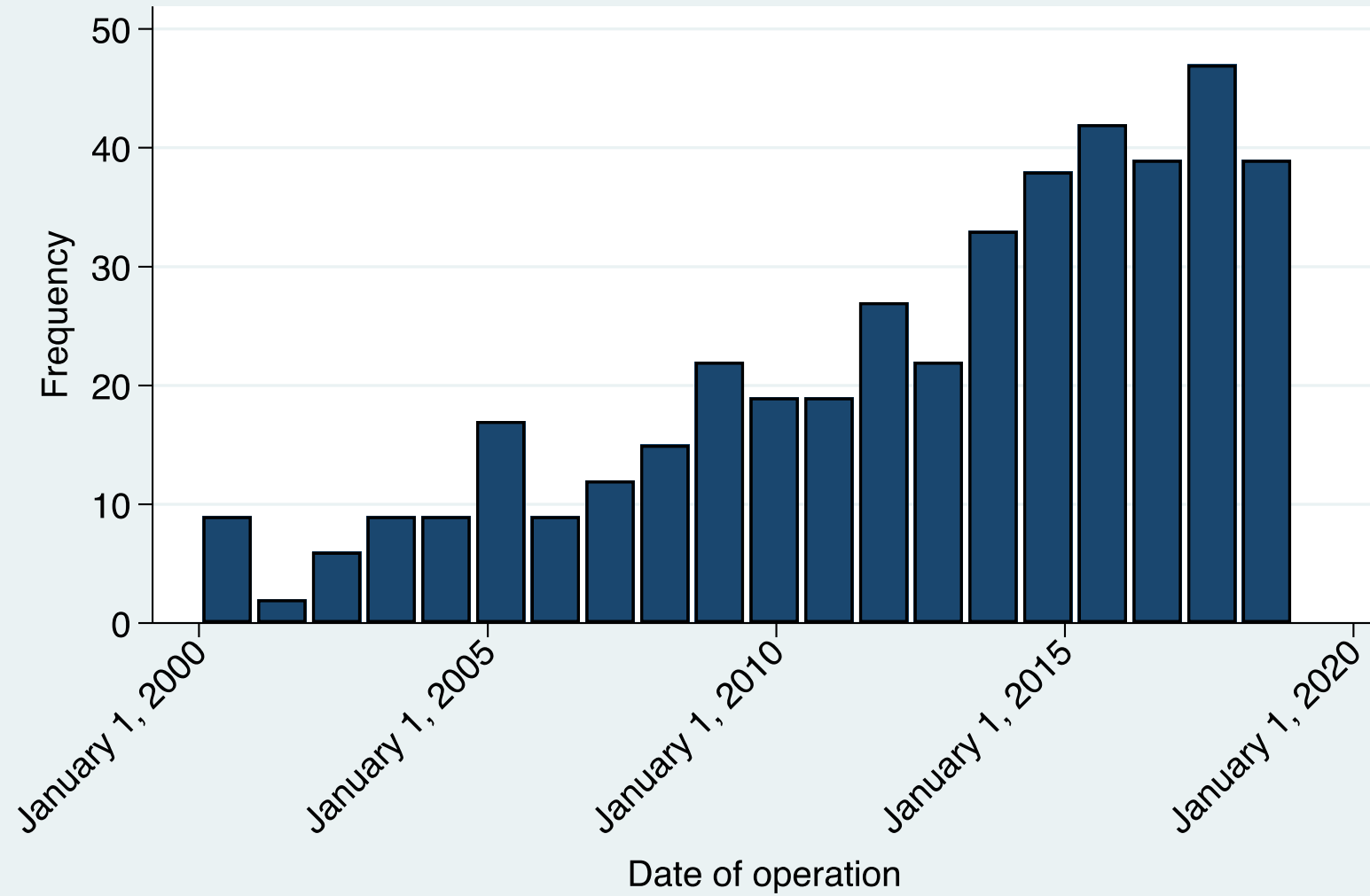


ORIGIN OF PRIMARY TUMOR

- 
- ▶ Renal cancer (N=195, 44.8%)
 - ▶ Lung cancer (N=121, 27.8%)
 - ▶ Colorectal (N=50, 11.5%)
 - ▶ Malignant melanoma (N=22, 5.1%)
 - ▶ Other (N=47, 10.8%)

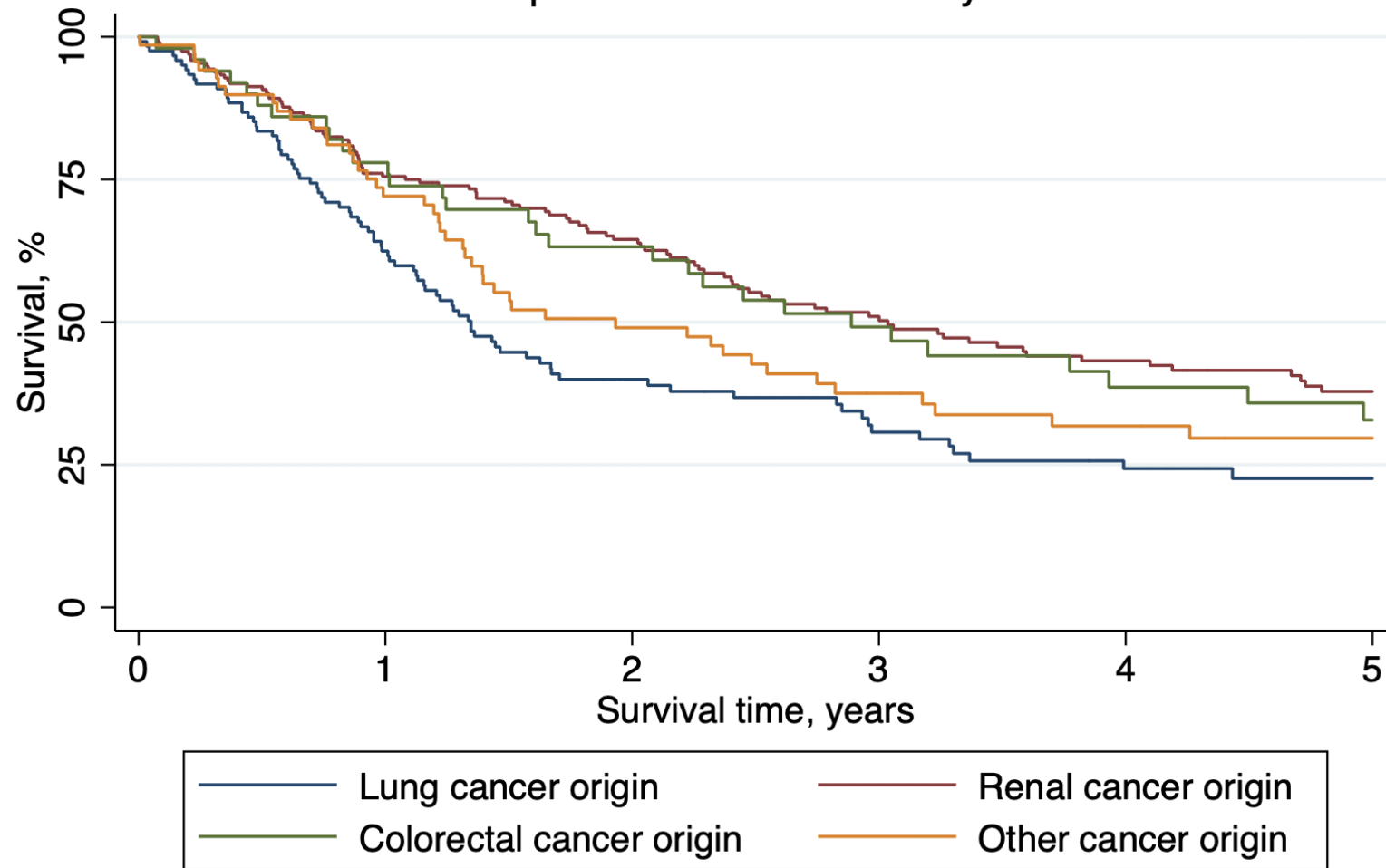


Adrenalectomy due to metastasis over time



Overall survival (N=435)

Kaplan-Meier Survival analysis



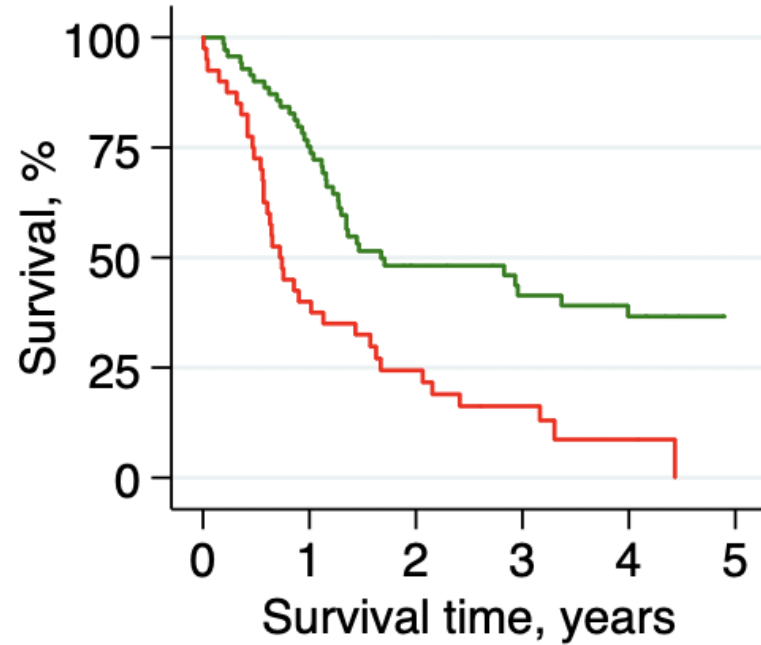
| MORTALITY RISK | | Lung cancer crude HR (95% c.i.) |
|---|--|------------------------------------|
| Age at surgery | | |
| Under 60 years | | 1.00 |
| 60–70 years | | 0.66 (0.41–1.07) |
| More than 70 years | | 0.50 (0.27–0.93) |
| CCI (per 1) | | 1.25 (0.99–1.59) |
| Tumour size | | |
| Under 25 mm | | 1.00 |
| 25–50 mm | | 1.32 (0.72–2.42) |
| More than 50 mm | | 2.66 (1.44–4.89) |
| Mode of discovery | | |
| Synchronous | | 1.33 (0.84–2.10) |
| Metachronous | | 1.00 |
| Extra-adrenal metastases at time of surgery | | |
| No | | 1.00 |
| Yes | | 1.79 (1.07–3.01) |
| Surgical approach | | |
| Laparoscopic | | 1.00 |
| Open | | 1.27 (0.69–2.36) |
| Radicality | | |
| R0 resection | | 1.00 |
| R1 resection | | 2.35 (1.51–3.65) |
| R2 resection | | 2.47 (0.98–6.25) |

Size, radicality and mortality in lung cancer

Kaplan Meier survival analysis

Lung cancer (N=121)

Size of adrenal metastasis



Number at risk

| | | | | | | |
|---------------|----|----|----|----|----|---|
| Size = ≤50 mm | 70 | 50 | 25 | 18 | 15 | 9 |
| Size = >50 mm | 40 | 16 | 9 | 5 | 2 | 0 |

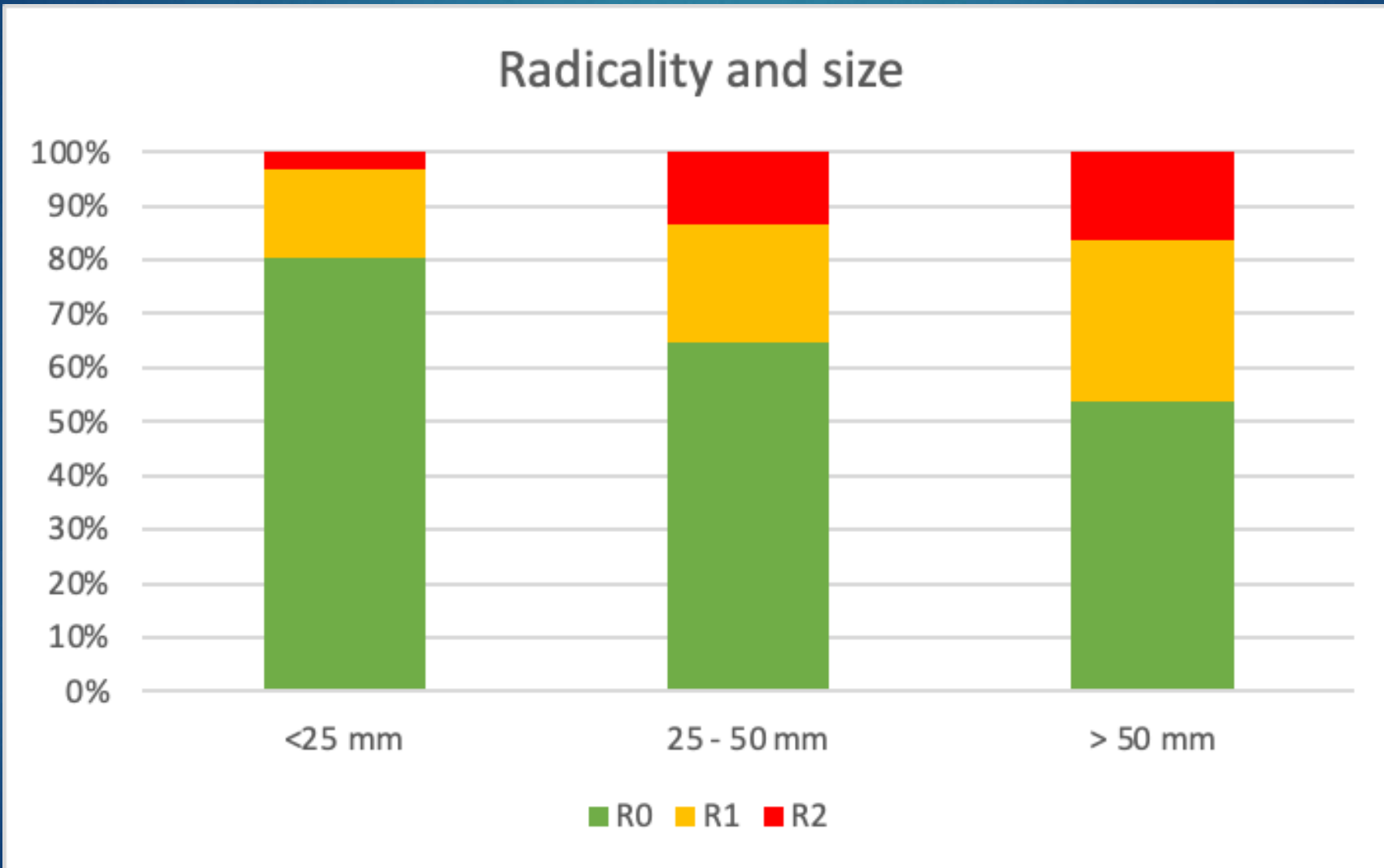
Size of adrenal metastasis ≤ 50 mm



Size of adrenal metastasis > 50 mm



Radicality and size



Radicality and size – local results

- ▶ Adrenalectomy in Aarhus in 9 years: 2013-2021 (N=492)
- ▶ Indication was a metastasis in 93 patients
- ▶ Operation in lung cancer patients: N=39

Radicality and size (N=39):

| | <25 mm (%) | 25-50 mm | >50 mm |
|------|------------|----------|--------|
| N | 11 | 21 | 7 |
| R0 | 11 (100) | 17 (81) | 4 (57) |
| R1/2 | 0 (0) | 4 (19) | 3 (43) |

Surgical complications (N=392)

| % | Lap | Open |
|-------------------|-----|------|
| No complications | 63 | 28 |
| Minor (I or II) | 25 | 39 |
| Major (III or IV) | 12 | 31 |
| 30 day mortality | 1 | 3 |

Strengths and limitations

- ▶ National study including all relevant patients
- ▶ Complete follow up
- ▶ Thorough review of health records
- ▶ Patient selection
 - ▶ Open vs. Laparoscopic
 - ▶ Candidate of surgery
- ▶ Oncologic treatment
 - ▶ Heterogeneous

Conclusion

- ▶ Significant proportion of patients achieved long-term survival
- ▶ Increasing demand
- ▶ Main factors of overall survival in lung cancer patients:
 - ▶ Age
 - ▶ Size
 - ▶ Radicality
 - ▶ Surgical approach (Lap vs open)
 - ▶ Complications available in published article
- ▶ Attention towards early surgical treatment

Best patients for adrenalectomy?

1. Previous lung cancer treatment – and previous normal adrenal glands
Now tumor in the adrenal gland (<50 mm)
PET-positive and no other metastases
2. New lung cancer (NSCLC) and adrenal tumor
No previous scans of adrenal glands
No other metastatic lesions
 - Are they related? Could it be a benign lesion / pheochromocytoma?
 - Exclude pheo with $HU_{tom} < 10$ or normal metanephrines

Thank you for your attention

► Questions?



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Original Article

Outcome and prognosis after adrenal metastasectomy: nationwide study

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Pheochromocytoma and risks

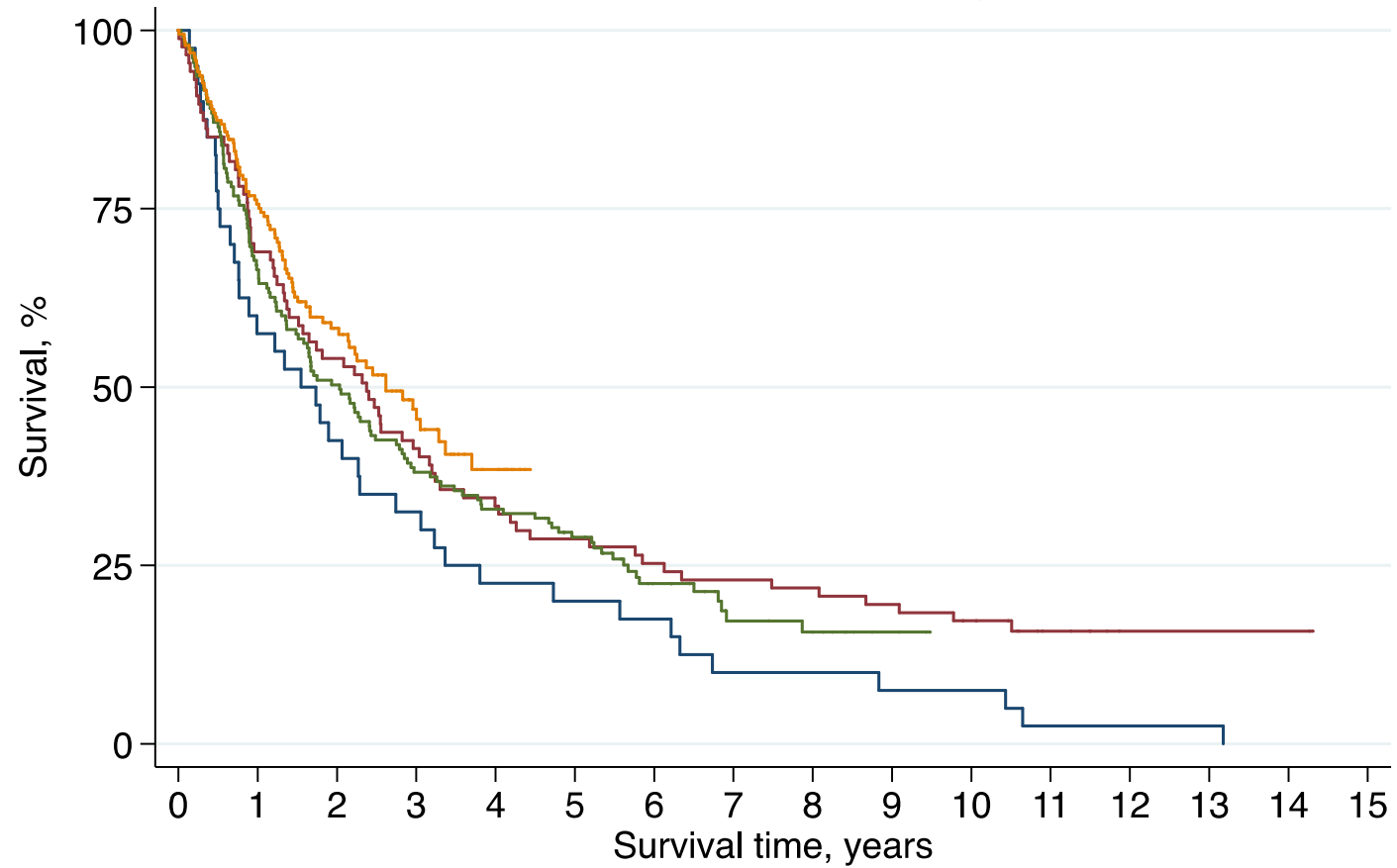
M.G. Sutton, Mayo Clinic

Review of a 50-year autopsy series

"Pheochromocytoma is surgically curable, and lethal complications often ensue when the diagnosis is not made. Hypertensive or hypotensive crisis precipitated by surgery for unrelated conditions was a common cause of death. "

Survival after year of procedure

Kaplan-Meier survival analysis



2000-2005

2010-2015

2005-2010

2015-2018

Potential prognostic predictors

Patient characteristics

Age, sex, BMI, comorbidities (CCI), ASA

Oncologic treatment

Radiotherapy, chemotherapy, immunotherapy

Biochemical blood markers

Lactatedehydrogenase, sodium, albumine, haemoglobin, thrombocytes, neutrophil granulocytes, c-reactive protein, alanine transaminase, and alkaline phosphatase

Tumor characteristics

Histologic type and subtype, tumor size, TNM, finding of metastasis (synchronous or metachronous), and resection margins

Surgical treatment

Delay from diagnosis of metastasis to surgery, type of surgery (laparoscopic or open), and volume of patients per hospital

Imaging prior to treatment

PET-scan